No. 682,040. Patented Sept. 3, 1901.

E. B. CORNELL.

GAS RETORT.

(Application filed Oct. 17, 1900.

(No Model.)

Fig. 1.

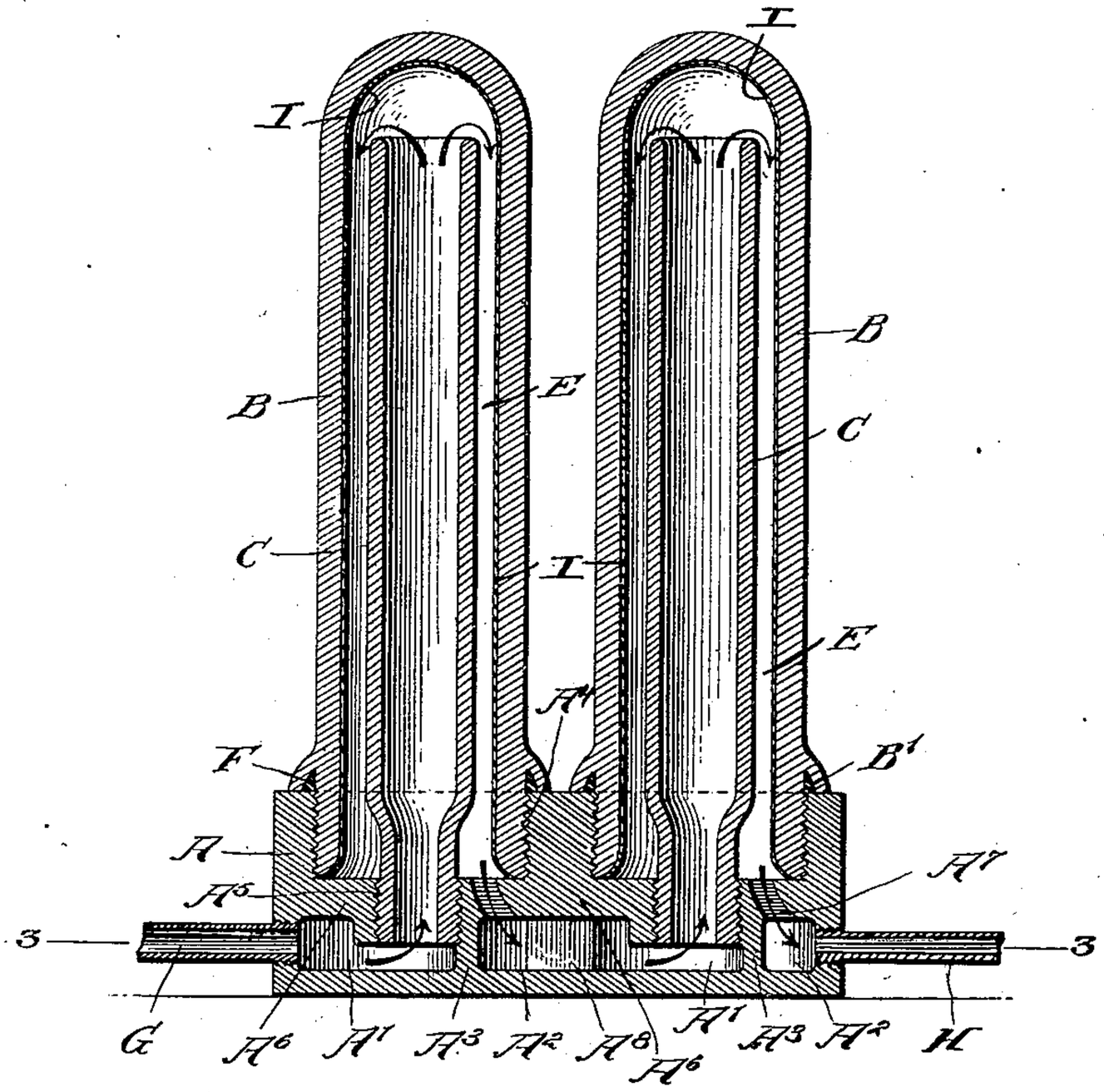


Fig. 2.

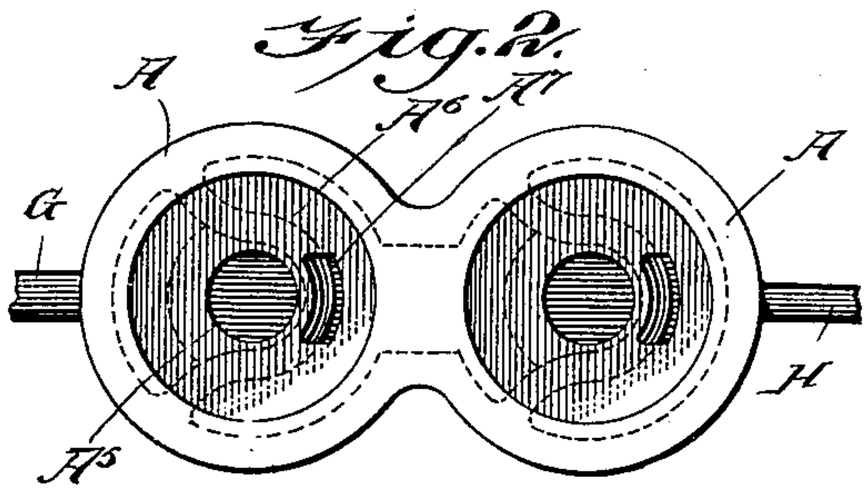
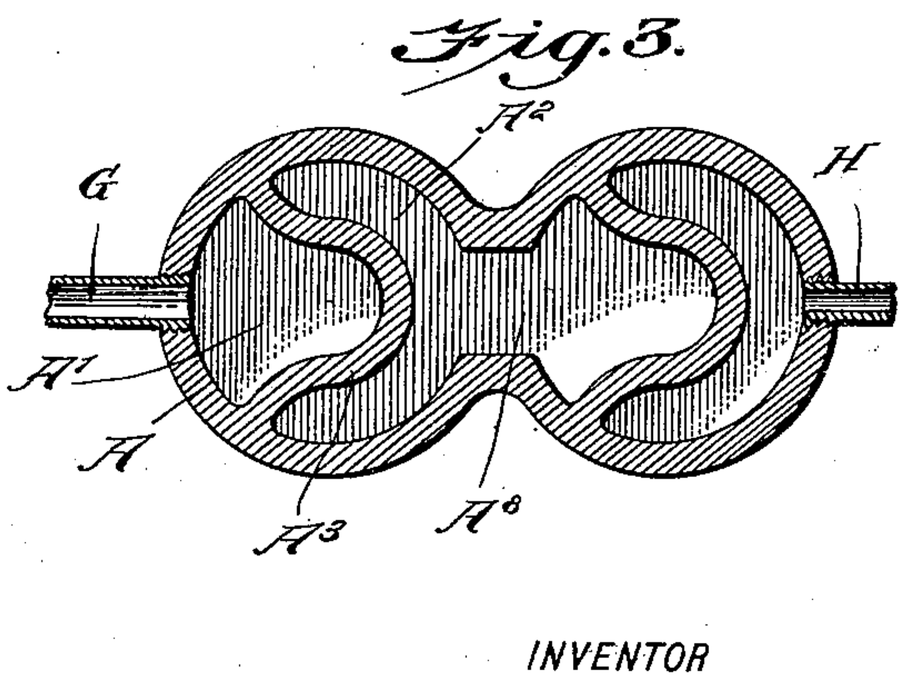


Fig. 3.



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UNITED STATES PATENT OFFICE.

ELIJAH BEANS CORNELL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO WILLIAM C. ALDERSON, OF SAME PLACE.

GAS-RETORT.

SPECIFICATION forming part of Letters Patent No. 682,040, dated September 3, 1901.

Application filed October 17, 1900. Serial No. 33,396. (No model.)

To all whom it may concern:

Be it known that I, ELIJAH BEANS CORNELL, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Retorts, of which the following is a full, clear, and exact description.

My invention relates to retorts, particularly to such as are adapted for use in the production of a fixed gas from atomized or volatilized hydrocarbons mixed with steam.

The object of my invention is to provide a construction by which the gas-forming material will be thoroughly subjected to the action of heat, so as to secure a rapid and complete gasification. This result I secure by the construction described hereinafter in detail, the novel features of which are pointed out in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional elevation of a set of my improved retorts. Fig. 2 is a plan thereof with the upper portions removed, and Fig. 3 is a sectional plan on the line 3 3 of Fig. 1.

The improved retorts are preferably arranged in sets of two or more, and each retort comprises a base A with an inlet-chamber A′ and an outlet-chamber A^2, separated by a vertical partition A^3, located to one side of the center of the base and curved, as shown best in Fig. 3. The base has two coaxial screw-threads A^4 A^5, respectively, to receive the lower ends of a shell B and of a core C, respectively, the core extending centrally within the shell and terminating short of the rounded upper end of the shell B. The core C is tubular and its interior communicates with the inlet-chamber A′ and with the annular chamber E, formed between the core and the shell. The lower end of the core may be contracted, as shown, and, as before stated, fits the screw-thread A^5, which is formed partly in the vertical partition A^3 and partly in a horizontal partition A^6, having an aperture A^7, which leads from the chamber or jacket E to the outlet-chamber A^2. When the retorts are arranged in a set, the outlet-chamber of one retort connects with the inlet-chamber of the adjacent retort by a passage A^8, provided in the base A. The shell B has at its lower part a flange B′, adapted to contain a packing-gasket F.

G is the inlet-tube, and H the outlet-tube, the latter being of a smaller interior diameter than the former.

The inner surfaces of the shells B—that is, those surfaces which are adapted to come in contact with the steam and other fluid admitted from the inlet G—are lined with a non-oxidizable material I.

In operation a mixture of steam and atomized or volatilized hydrocarbon is admitted through the inlet G, it being understood that the retorts are placed in a furnace or other apparatus, where they are subjected to a high degree of heat. The gaseous mixture passes first through the inlet-chamber A′ into the tubular core C and escaping at the upper end thereof is spread in a thin film over the outer surface of the core and the inner surface of the shell B. The latter is very highly heated and the thin film of steam and hydrocarbon is effectively exposed to the action of this high heat, and the steam is decomposed, the result being the formation of a fixed gas. I do not, however, lay any claim in the present application to the formation of a fixed gas by the method outlined above. In its passage through the second retort the steam, which as a rule is incompletely decomposed in the first retort, is further acted upon, and it will be understood that the apparatus comprises as many retorts as are required to secure a complete decomposition with the available heat. The reduction of the area of the outlet H relatively to the inlet G retards the flow of the fluid, and thus gives more time for the completion of the process.

It will of course be understood that the retorts are subjected to considerable heat, and consequently high pressure, (say about two hundred pounds per square inch or more,) and that the retorts are made of sufficient strength to resist such interior pressure.

The formation of the core B with a contracted lower portion and a widened upper portion is of advantage, in that it affords sufficient room for a strong partition A^6 and for

an outlet-passage A^7 of proper width. At the same time the speed of the incoming fluid is reduced when it reaches the widened portion of the core, and the fluid consequently remains subjected to the action of the heat during a longer period.

I desire to call particular attention to the provision within the retort of a core which forms the gaseous fluid into a thin sheet or film, all particles of which are evenly exposed to the action of heat. In retorts used hitherto for the production of gas from heated fluid there is a relatively slow and incomplete action, owing to the failure of the heat to effectively reach the particles of the fluid which are at the center of the stream or body of fluid. While I have shown an arrangement for passing the fluid first through the core and then back on the outside thereof, the reverse arrangement may be adopted. This and other modifications may be made without departing from the nature of my invention as set forth in the appended claims.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A retort comprising a base having an inlet and an outlet with a partition separating them, a shell and an open-end core provided with a contracted end and located within the shell, the said core having its contracted end fitted into said partition.

2. A retort comprising a base having an inlet and an outlet with a partition separating them, also coaxial sockets, a shell fitted into one of said sockets and having a grooved exterior flange adjacent to the socket, a packing-ring seated in the groove of said flange and engaging the outer wall of said socket, and an open-end tubular core fitted into the other socket.

3. A retort comprising a shell, a core located within the shell and spaced therefrom to form a chamber or jacket surrounding the core, an inlet-tube leading to the retort and communicating with said chamber, and an outlet-tube leading from the retort and likewise communicating with said chamber, the outlet-tube having a smaller bore than the inlet-tube.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ELIJAH BEANS CORNELL.

Witnesses:
JOHN LOTKA,
EVERARD BOLTON MARSHALL.